Agency for Healthcare Research and Quality
Advancing Excellence in Health Care

NATIONAL GUIDELINE CLEARINGHOUSE

General

Guideline Title

Gestational diabetes mellitus evidence-based nutrition practice guideline.

Bibliographic Source(s)

Academy of Nutrition and Dietetics. Gestational diabetes mellitus evidence-based nutrition practice guideline. Chicago (IL): Academy of Nutrition and Dietetics; 2016. Various p.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: American Dietetic Association (ADA). Gestational diabetes mellitus (GDM). Evidence based nutrition practice guideline. Chicago (IL): American Dietetic Association (ADA); 2008. Various p. [234 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

NEATS Assessment

National Guideline Clearinghouse (NGC) has assessed this guideline's adherence to standards of trustworthiness, derived from the Institute of Medicine's report Clinical Practice Guidelines We Can Trust.

= Poor = Fair = Good = Very Good = Excellent

Assessment	Standard of Trustworthiness
YES	Disclosure of Guideline Funding Source
	Disclosure and Management of Financial Conflict of Interests
	Guideline Development Group Composition

YES	Multidisciplinary Group
YES	Methodologist Involvement
▮▮▯▯▯	Patient and Public Perspectives
	Use of a Systematic Review of Evidence
▮▮▮▮▯	Search Strategy
▮▮▮▮▯	Study Selection
▮▮▮▮▯	Synthesis of Evidence
	Evidence Foundations for and Rating Strength of Recommendations
▮▮▮▮▯	Grading the Quality or Strength of Evidence
▮▮▮▮▮	Benefits and Harms of Recommendations
▮▮▮▮▮	Evidence Summary Supporting Recommendations
▮▮▮▮▮	Rating the Strength of Recommendations
▮▮▮▮▮	**Specific and Unambiguous Articulation of Recommendations**
▮▮▮▮▮	**External Review**
▮▮▮▮▮	**Updating**

Recommendations

Major Recommendations

Ratings for the strength of the recommendations (Strong, Fair, Weak, Consensus, Insufficient Evidence), conclusion grades (I-V), and statement labels (Conditional versus Imperative) are defined at the end of the "Major Recommendations" field.

Gestational Diabetes Mellitus (GDM): Referral to a Registered Dietitian Nutritionist (RDN) 2016

GDM: Referral to an RDN

Pregnant women who are diagnosed with GDM should be referred to a RDN for medical nutrition therapy (MNT). Individualized MNT is important in helping pregnant women with GDM achieve and maintain normal glycemic levels and appropriate weight gain, while meeting essential nutrients for pregnancy to promote positive maternal and fetal outcomes.

Strong, Imperative

Recommendation Strength Rationale

This topic was not included in the Evidence Analysis Library (EAL) systematic review. The Academy of Nutrition and Dietetics and the GDM Expert workgroup concur with the American Diabetes Association's *Standards of Medical Care in Diabetes 2016* recommendation rating for "Management of Diabetes in

Pregnancy (GDM)" and The Endocrine Society's *Diabetes and Pregnancy: an Endocrine Society Clinical Practice Guideline* recommendation ratings for "Nutrition Therapy and Weight Gain Targets for Women with Overt or GDM" and "Management of Elevated Blood Glucose."

GDM: Nutrition Assessment 2016

GDM: Assessment of Food/Nutrition-related History of Women with GDM

The RDN should assess the food and nutrition-related history of women with GDM including, but not limited to:

- Food, beverage and nutrient intake including:
  - Calorie intake
  - Types and amount of carbohydrate (including fiber), fat, protein; with special attention to high calorie, low-nutrient dense foods such as desserts, candy, sugar-sweetened beverages
  - Serving sizes
  - Meal and snack patterns, including frequency and duration
    - Recent changes
    - Preferences, avoidance, intolerances, allergies including:
      - In relationship to gastrointestinal discomforts (e.g., nausea, vomiting, heartburn, constipation, ptyalism)
      - Reaction to or changes in food tastes/smells related to pregnancy
      - Cultural and religious considerations.
- Appetite and changes in appetite
- Eating environment and meals eaten away from home
- Diet history and behavior: previous diets and diet adherence, disordered eating
- Factors affecting access to food: psychosocial/economic issues (e.g., social support) impacting nutrition therapy
- Method of food preparation, food safety
- Pharmacologic therapy (including insulin or oral glucose-lowering agent)
- Substance use: alcohol, tobacco, caffeine, recreational drugs
- Use of dietary supplements, prenatal vitamins, over-the-counter medications, complementary and/or herbal
- Knowledge, beliefs or attitudes: motivation, readiness to change, self-efficacy; willingness and ability to make lifestyle changes
- Physical activity and function: exercise patterns, functionality for activities of daily living, sleep patterns

Assessment of these factors is needed to effectively determine nutrition diagnoses and formulate a nutrition care plan. Inability to achieve optimal nutrient intake may contribute to poor outcomes.

Consensus, Imperative

GDM: Assessment of Anthropometric Measurement of Women with GDM

The RDN should assess the following anthropometric measurements in women with GDM, including but not limited to:

- Height, current weight, pre-pregnancy weight and body mass index (BMI)
- Weight changes during pregnancy

Assessment of these factors is needed to effectively determine nutrition diagnoses and formulate a nutrition care plan.

Consensus, Imperative

GDM: Assessment of Biochemical Data, Medical Tests, and Procedures of Women with GDM

The RDN should evaluate available data of women with GDM and recommend as indicated: biochemical

data, medical tests and procedures including, but not limited to:

- Glycemic tests: glucose challenge test (GCT), oral glucose tolerance test (OGTT), glycosylated hemoglobin (A1C), fasting glucose, random glucose
- Use of self-monitoring blood glucose (SMBG) meters and urinary ketones, if recommended
- Maternal and fetal testing (e.g., ultrasounds, biophysical profile, non-stress testing)
- Nutritional anemia profile (e.g., hemoglobin, hematocrit, folate, B_{12}, iron)
- Vitamin D and other micronutrient levels, as appropriate
- Thyroid function
- Kidney function

Assessment of these factors is needed to effectively determine nutrition diagnoses and formulate a nutrition care plan.

Consensus, Imperative

GDM: Assessment of Nutrition-Focused Physical Findings and Client History of Women with GDM

The RDN should evaluate available data regarding the client history and nutrition-focused physical findings of women with GDM including, but not limited to:

Patient/Family/Client Medical/Health History

- Age
- Single or multiple fetuses
- Weeks of gestation; estimated date of delivery (EDD); method of delivery
- Previous obstetric history including GDM
- Risk factors for developing GDM or diabetes, including family history of diabetes
- General health; vital signs
- Pertinent medical and dental history including other diseases, conditions and illnesses
- Gastrointestinal discomforts: nausea, vomiting, diarrhea, constipation, heartburn and ptyalism
- Health literacy and numeracy
- Education and occupation
- Social history: psychological/socioeconomic factors (e.g., social support)

Assessment of these factors is needed to effectively determine nutrition diagnoses and formulate a nutrition care plan.

Consensus, Imperative

Recommendation Strength Rationale

Consensus: This topic was not included in the EAL systematic review. The recommendations are based on consensus publications.

GDM: MNT 2016

GDM: MNT

The RDN should provide MNT that includes an individual nutrition prescription and nutrition counseling for all women diagnosed with GDM. Research indicates that MNT provided by an RDN (or international equivalent) as part of a comprehensive nutrition intervention that includes individualization of MNT is effective in improving blood glucose control and neonatal and maternal outcomes in women with GDM. Improved outcomes included lower birth weight and a reduction in the following: incidence of macrosomia (large for gestational age [LGA]), need for insulin therapy, hypertensive disorders of pregnancy and maternal hospitalizations, neonatal intensive care unit (NICU) admissions and neonatal deaths, premature births and rate of shoulder dystocia, bone fracture and nerve palsy.

Strong, Imperative

GDM: Frequency and Duration of MNT

The RDN should provide regular and frequent MNT visits to women with GDM to optimize outcomes. Visits should include an initial 60 to 90 minute MNT visit, followed by a second MNT visit (30 to 45 minutes) within one week, and a third MNT visit (15 to 45 minutes) within two to three weeks. Additional MNT visits should be scheduled every two to three weeks or as needed for the duration of the pregnancy. MNT assists the woman with GDM in meeting her blood glucose and weight gain targets, contribute to a well-balanced food intake and promote fetal and maternal well-being.

Consensus, Imperative

Recommendation Strength Rationale

> Conclusion statement supporting the recommendation *GDM: MNT* is Grade II
> Consensus: The recommendation *GDM: Frequency and Duration of MNT* is based on consensus publications. This topic was included in the EAL systematic review. However, no evidence was found to answer the research question.

GDM: Calories 2016

GDM: Calorie Prescription

For women with GDM, the RDN should individualize the calorie prescription based on a thorough nutrition assessment with guidance from relevant references (Dietary Reference Intakes [DRI], Institute of Medicine [IOM]) and encourage adequate caloric intake to promote fetal/neonatal and maternal health, achieve glycemic goals, and promote appropriate gestational weight gain (GWG). No definitive research suggests there is a specific optimal calorie intake for women with GDM or if calorie needs are different than pregnant women without GDM. Limited research in women with GDM whose pre-pregnancy weights ranged from normal to obese showed no significant differences in most fetal/neonatal and maternal outcomes with various reported calorie intakes. In a study of obese women only, GWG slowed after women with GDM reportedly consumed 30% below their caloric requirements, without adverse effects.

Fair, Imperative

Recommendation Strength Rationale

Conclusion statement supporting *GDM: Calorie Prescription* is Grade III.

GDM: Macronutrients 2016

GDM: Macronutrient Requirements

In women with GDM, the RDN should provide adequate amounts of macronutrients to support pregnancy, based on nutrition assessment, with guidance from the DRI. The DRI for all pregnant women, including those with GDM, recommends a minimum of 175 g carbohydrate (CHO), a minimum of 71 g protein (or 1.1 g per kg per day protein) and 28 g fiber.

Consensus, Imperative

GDM: Carbohydrate Prescription

The RDN should individualize both the amount and type of CHO for women with GDM based on nutrition assessment, treatment goals, blood glucose response and patient needs. Limited evidence does not confirm an ideal amount (grams or percent of total calories) of CHO for all women with GDM, but suggests an interaction between the amount and type of CHO. Several studies showed positive effects on glycemic control and neonatal/fetal and maternal outcomes in women with GDM, when evaluating varying amounts and types of CHO.

Fair, Imperative

GDM: Carbohydrate and Post Prandial Breakfast Glycemia (PPBG)

The RDN should individualize both the amount and type of CHO at breakfast based on nutrition assessment, treatment goals, blood glucose response and patient needs. If the woman with GDM continues to experience elevated PPBG after breakfast, the RDN may further modify the amount or the type of CHO at breakfast to achieve blood glucose targets. Limited evidence examining the impact of CHO on PPBG after breakfast does not confirm an ideal amount (grams or percentage of total calories) or type of CHO for all women with GDM to achieve PPBG targets after breakfast, but suggests an interaction between the two.

Fair, Imperative

Recommendation Strength Rationale

> The recommendation *GDM: Macronutrient Requirements* is based on consensus publications. The topic was not included in the EAL systematic review.
> Three conclusion statements supporting the recommendation *GDM: Carbohydrate Prescription* are Grade III
> Conclusion statement supporting the recommendation *GDM: Carbohydrate and Post Prandial Breakfast Glycemia* is Grade III

GDM: Vitamins and Minerals 2016

GDM: Dietary Vitamins and Mineral Intake

The RDN should encourage women with GDM to make healthy food choices and consume a variety of foods to meet the micronutrient needs of pregnancy. The micronutrient needs of women with GDM are the same as for pregnant women without diabetes (emphasis on dietary intake of iron, folate, calcium, vitamin D, choline and iodine). The consumption of more food to meet caloric needs and the increased absorption and efficiency of nutrient utilization that occurs in pregnancy are generally adequate to meet the needs for most nutrients, when good food choices are consistently made.

Consensus, Imperative

GDM: Vitamin and Mineral Supplementation

The RDN should consider recommending dietary supplementation within the DRI for pregnancy with a prenatal multivitamin/mineral or specific vitamin or mineral supplement(s) to address inadequate dietary vitamin and mineral intake (e.g., iron, folate, calcium, vitamin D, choline and iodine) or documented micronutrient deficiency. Dietary supplements may be indicated in pregnant women at high risk for inadequate micronutrient intake, such as food insecurity; alcohol, tobacco or other substance dependency; anemia; strict vegetarian (vegan) diet; or poor eating habits.

Consensus, Imperative

Recommendation Strength Rationale

Consensus: This topic was not included in the EAL systematic review. The recommendations are based on consensus publications.

GDM: Meal and Snack Distribution 2016

GDM: Meal and Snack Distribution

In women with GDM, the RDN should distribute the total calories and CHO into smaller meals and multiple snacks per day. The distribution should be individualized, based on blood glucose levels, physical activity and medication, if any (e.g., insulin) and adjusted as needed. Three meals and two or more snacks helps to distribute CHO intake and reduce post-prandial blood glucose fluctuations.

Consensus, Imperative

Recommendation Strength Rationale

Consensus: This topic was included in the EAL systematic review. However, no evidence was found to answer the research question. The recommendation is based on consensus publications.

GDM: High-Intensity Sweeteners 2016

GDM: Use of High-Intensity Sweeteners

In pregnant women with GDM who choose to consume high-intensity sweeteners, the RDN should educate the woman to select only those approved or generally recognized as safe (GRAS) by the U.S. Food and Drug Administration (FDA) and to limit her intake to the acceptable daily intake (ADI), established by the FDA. The FDA has concluded the safety of six high-intensity sweeteners (saccharin, aspartame, acesulfame potassium [Ace-K], sucralose, neotame and advantame) when consumed within the ADI by the general population, including pregnant women. Steviol glycosides and Luo Han Guo (monk fruit) extracts are also GRAS when consumed within the ADI.

Consensus, Conditional

Recommendation Strength Rationale

Consensus: This topic was not included in the EAL systematic review. The recommendation is based on consensus publications.

GDM: Alcohol 2016

GDM: Alcohol Intake

The RDN should reinforce abstinence from alcohol during pregnancy for women with GDM. The safest choice for all pregnant women is to abstain from alcohol to eliminate the risk for alcohol-related birth defects such as behavioral or neurological defects, growth deficiencies, facial abnormalities and impaired intellectual development.

Consensus, Imperative

Recommendation Strength Rationale

Consensus: This topic was not included in the EAL systematic review. The recommendation is based on consensus publications.

GDM: Physical Activity 2016

GDM: Physical Activity

Unless contraindicated, the RDN should encourage women with GDM to engage in a goal to achieve daily moderate exercise of 30 minutes or more per day. In addition to a healthy diet, exercise can help improve blood glucose control and achieve weight gain recommendations. Both aerobic exercise and non–weight-bearing exercise (e.g., stretching, swimming, yoga, etc.) have been shown to lower blood glucose levels in women with GDM. Lifestyle therapy for GDM results in lower birth weight and a lower incidence of large-for-gestational-age births and pre-eclampsia.

Strong, Conditional

Recommendation Strength Rationale

The Academy of Nutrition and Dietetics and the GDM Expert workgroup concur with The Endocrine Society's *Diabetes and Pregnancy: an Endocrine Society Clinical Practice Guideline* recommendation rating for "Management of Elevated Blood Glucose."

GDM: Nutrition Monitoring and Evaluation 2016

GDM: Nutrition Monitoring and Evaluation

Following the nutrition intervention of women with GDM, to check progress, the RDN should monitor and

evaluate the following components at each visit and compare to desired individual outcomes relevant to the nutrition diagnosis and nutrition intervention. This may include, but is not limited to:

Food/Nutrition-Related History Outcomes

- Daily food intake in relation to post-meal glucose readings
- Food, beverage and nutrient intake including
  - Calorie intake; types and amount of carbohydrate (including fiber) fat, protein; with special attention to high calorie, low-nutrient dense foods such as desserts, candy, sugar-sweetened beverages
  - Serving sizes
  - Meal and snack patterns, including frequency and duration
  - Recent changes to food choices and/or eating pattern
  - Preferences, avoidance, intolerances, allergies including
    - In relationship to gastrointestinal discomforts (e.g., nausea, vomiting, heartburn, constipation, ptyalism)
    - Reaction to or changes in food tastes/smells related to pregnancy
    - Cultural and religious considerations.
  - Appetite and changes in appetite
  - Frequency and intake of meals and snacks; meals eaten away from home
  - Methods of food preparation; food safety
  - Recommendation to add pharmacologic therapy (oral and/or insulin therapy) to maintain nutrient intake and achieve glycemic targets
    - Pharmacologic therapy – dose of diabetes medications: oral glucose-lowering agent and insulin
  - Changes in substance use: alcohol, tobacco, caffeine, recreational drugs
  - Knowledge, beliefs or attitudes: motivation, readiness to change, self-efficacy; willingness and ability to make lifestyle changes; understanding of the treatment plan for GDM
  - Physical activity and function: exercise patterns, functionality for activities of daily living, sleep patterns

Anthropometric Measurement Outcomes

Weight changes compared to previous obstetric visit or MNT visit

Biochemical Data, Medical Tests, and Procedure Outcomes

- Self-monitoring blood glucose (SMBG) records, including meter downloads
- Ketone testing records (if previously recommended because of weight loss or inadequate calorie intake)
- Updated fetal and maternal testing or lab values

Nutrition monitoring and evaluation of these factors is needed to correctly/effectively diagnose nutrition problems that should be the focus of further nutrition interventions. Inability to achieve optimal nutrient intake may contribute to poor outcomes or initiation of or changes in pharmacologic therapy.

Consensus, Imperative

Recommendation Strength Rationale

Consensus: This topic was not included in the EAL systematic review. The recommendation is based on consensus publications.

Definitions

Conditional versus Imperative Recommendations

Recommendations are categorized in terms of either *imperative* or *conditional* statements.

Imperative statements are broadly applicable to the target population and do not impose restraints on their pertinence. Imperative recommendations may include terms such as "should" or "may" and do not contain conditional text that would limit their applicability to specified circumstances. *Conditional* statements clearly define a specific situation or population. Conditional recommendations are often presented in an if/then format, such that if CONDITION then ACTION(S) because REASONS(S)

Fulfillment of the condition triggers one or more guideline-specified actions.

Criteria for Recommendation Ratings

Statement Rating	Definition	Implication for Practice
Strong	A Strong recommendation means that the workgroup believes that the benefits of the recommended approach clearly exceed the harms (or that the harms clearly exceed the benefits in the case of a strong negative recommendation), and that the quality of the supporting evidence is excellent/good (grade I or II). In some clearly identified circumstances, strong recommendations may be made based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits strongly outweigh the harms.	Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.
Fair	A Fair recommendation means that the workgroup believes that the benefits exceed the harms (or that the harms clearly exceed the benefits in the case of a negative recommendation), but the quality of evidence is not as strong (grade II or III). In some clearly identified circumstances, recommendations may be made based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits outweigh the harms.	Practitioners should generally follow a Fair recommendation but remain alert to new information and be sensitive to patient preferences.
Weak	A Weak recommendation means that the quality of evidence that exists is suspect or that well-done studies (grade I, II, or III) show little clear advantage to one approach versus another.	Practitioners should be cautious in deciding whether to follow a recommendation classified as Weak, and should exercise judgment and be alert to emerging publications that report evidence. Patient preference should have a substantial influencing role.
Consensus	A Consensus recommendation means that Expert opinion (grade IV) supports the guideline recommendation even though the available scientific evidence did not present consistent results, or controlled trials were lacking.	Practitioners should be flexible in deciding whether to follow a recommendation classified Consensus, although they may set boundaries on alternatives. Patient preference should have a substantial influencing role.
Insufficient Evidence	An Insufficient Evidence recommendation means that there is both a lack of pertinent evidence (grade V) and/or an unclear balance between benefits and harms.	Practitioners should feel little constraint in deciding whether to follow a recommendation labeled as Insufficient Evidence and should exercise judgment and be alert to emerging publications that report evidence that clarifies the balance of benefit versus harm. Patient preference should have a substantial influencing role.

Adapted by the Academy of Nutrition and Dietetics (AND) from the American Academy of Pediatrics, Classifying Recommendations for Clinical Practice Guideline, Pediatrics. 2004;114;874-7. Revised by the AND Evidence-Based Practice Committee, Feb 2006.

Conclusion Grading Table

Strength of Evidence Elements	Grade I Good/Strong	Grade II Fair	Grade III Limited/Weak	Grade IV Expert Opinion Only	Grade V Grade Not Assignable
Quality Scientific rigor/validity Considers design and execution	Studies of strong design for question Free from design flaws, bias and execution problems	Studies of strong design for question with minor methodological concerns OR Only studies of weaker study design for question	Studies of weak design for answering the question OR Inconclusive findings due to design flaws, bias or execution problems	No studies available Conclusion based on usual practice, expert consensus, clinical experience, opinion, or extrapolation from basic research	No evidence that pertains to question being addressed
Consistency Of findings across studies	Findings generally consistent in direction and size of effect or degree of association, and statistical significance with minor exceptions at most	Inconsistency among results of studies with strong design OR Consistency with minor exceptions across studies of weaker designs	Unexplained inconsistency among results from different studies OR Single study unconfirmed by other studies	Conclusion supported solely by statements of informed nutrition or medical commentators	NA
Quantity Number of studies Number of subjects in studies	One to several good quality studies Large number of subjects studied Studies with negative results having sufficiently large sample size for adequate statistical power	Several studies by independent investigators Doubts about adequacy of sample size to avoid Type I and Type II error	Limited number of studies Low number of subjects studied and/or inadequate sample size within studies	Unsubstantiated by published studies	Relevant studies have not been done
Clinical Impact Importance of studies outcomes Magnitude of effect	Studied outcome relates directly to the question Size of effect is clinically meaningful Significant (statistical) difference is large	Some doubt about the statistical or clinical significance of effect	Studies outcome is an intermediate outcome or surrogate for the true outcome of interest OR Size of effect is small or lacks statistical and/or clinical significance	Objective data unavailable	Indicates area for future research
Generalizability To population of interest	Studied population, intervention and outcomes are free from	Minor doubts about generalizability	Serious doubts about generalizability due to narrow or different	Generalizability limited to scope of experience	NA

Strength of Evidence Elements	Grade I Good/Strong	Grade II Fair	Grade III Limited/Weak	Grade IV Expert Opinion Only	Grade V Grade Not Assignable
	serious doubts about generalizability		study population, intervention or outcomes studied		

Clinical Algorithm(s)

None provided

Scope

Disease/Condition(s)

Gestational diabetes mellitus (GDM)

Guideline Category

Evaluation

Management

Treatment

Clinical Specialty

Endocrinology

Family Practice

Nursing

Nutrition

Obstetrics and Gynecology

Intended Users

Advanced Practice Nurses

Dietitians

Health Care Providers

Nurses

Pharmacists

Physician Assistants

Physicians

Students

Guideline Objective(s)

Overall Objective

To provide evidence-based medical nutrition therapy (MNT) recommendations for management of GDM that assist in achieving and maintaining glycemia, promote appropriate maternal weight gain and optimal fetal growth and development, and reduce the risk of adverse maternal and neonatal outcomes

Specific Objectives

- To define evidence-based recommendations for RDNs that are carried out in collaboration with other healthcare providers
- To guide practice decisions that integrate medical and lifestyle interventions (nutrition, physical activity and behavioral elements)
- To reduce variations in practice among RDNs and other health professionals who may use these guidelines
- To promote self-management strategies that empower the patient to take responsibility for day-to-day management and to provide the RDN with data to make recommendations to adjust MNT or recommend other therapies to achieve clinical outcomes
- To enhance the quality of life for the patient, utilizing customized strategies based on the individual's preferences, lifestyle and goals
- To develop content for intervention that can be tested for impact on clinical outcomes
- To define the highest quality of care within cost constraints of the current healthcare environment

Target Population

Adult pregnant women with gestational diabetes mellitus (GDM)

Note: This guideline is not intended for pregnant women with pre-existing diabetes (type 1 or 2), undiagnosed type 2 diabetes, or women who are at risk for developing GDM (without diagnosis of GDM). Therefore, clinical judgment is crucial in the application of these guidelines for individuals other than adult women with GDM.

Interventions and Practices Considered

Evaluation

- Referral to a registered dietitian nutritionist
- Nutritional assessment
  - Food/nutrition-related history
  - Anthropometric measurements
  - Biochemical data, medical tests and procedures
  - Nutrition-focused physical findings and client history

Management/Treatment

- Medical nutrition therapy (MNT)
- Calorie prescription
- Ensuring adequate macronutrient (carbohydrate, protein, fiber) and vitamin/mineral intake
- Meal and snack distribution
- Controlled intake of high-intensity sweeteners
- Abstention from alcohol
- Physical activity
- Nutrition monitoring and evaluation

Major Outcomes Considered

- Blood glucose control: fasting and post prandial blood glucose, glycosylated hemoglobin (HbA1c)
- Maternal weight gain: inappropriate weight gain (Institute of Medicine [IOM] standards)

- Fetal growth/birth weight
- Adverse fetal/neonatal outcomes: mortality, macrosomia, large- and small-for-gestational age, shoulder dystocia, jaundice, hypoglycemia, prematurity
- Adverse maternal outcomes: mortality, mode of birth (e.g., C section, labor induction), hypertension/preeclampsia, insulin therapy

Methodology

Methods Used to Collect/Select the Evidence

Hand-searches of Published Literature (Primary Sources)

Hand-searches of Published Literature (Secondary Sources)

Searches of Electronic Databases

Description of Methods Used to Collect/Select the Evidence

General Methods for Collecting/Selecting the Evidence

The following list provides an overview of the steps which the Academy evidence analysis team goes through to identify research through database searches.

Plan the search strategy to identify the current best evidence relevant to the question. The plan for identification and inclusion of articles and reports should be systematic and reproducible, not haphazard. Write out the original search strategy and document adjustments to the strategy if they occur. Allow for several iterations of searches.

List inclusion and exclusion criteria. The workgroup will define the inclusion and exclusion criteria. These criteria will be used in defining the search strategy and for filtering the identified research reports. The Academy uses only peer-reviewed research; that is, articles accepted for evidence analysis must be peer-reviewed and published in a juried publication. Additionally, the Academy only uses human subjects in its research and does not include animal studies in its evidence analysis.

Identify search words. During the process of considering outcomes, interventions, nutrition diagnoses, and assessments, the workgroup may have identified a number of specific terms or factors that were important, but were not included in the actual question. These terms can be used as additional search terms to help identify relevant pieces of research. Both text word search and keyword search using Medical Subject Headings (MeSH) definitions may be used.

Identify databases to search. PubMed, Medline, CINAHL, EMBASE, Cochrane, Agricola, DARE, TRIP, AHRQ and ERIC are some common databases for clinical nutritional research. Note that search terms can vary depending on the database.

Conduct the search. Depending on the number and type of sources found in the initial search, adjustments might have to be made in the search strategy and to inclusion/exclusion criteria, and additional searches run. Changes to the search plan should be recorded for future reference. Document the number of sources identified in each search.

Review titles and abstracts. At this point, a filtering procedure is used to determine whether a research article matches the inclusion criteria and is relevant to the workgroup's questions. Typically, the lead analyst, along with a member of the expert workgroup, first reviews the citations and abstracts to filter out reports that are not applicable to the question. If a determination cannot be made based on the citation and abstract, then the full text of the article is obtained for review.

Gather all remaining articles and reports. Obtain paper or electronic copies of research articles that remain on the list following the citation and abstract review. If there are less than six citations, it could mean that the search was too specific to identify relevant research or that research has not

been done on this topic. A broadened search should be tried. When there is a long list of citations, ascertain whether it includes articles that are tangential to the question or address the question in only a general way. In this case a more focused search strategy may be necessary.

Specific Methods for This Guideline

Searches of PubMed and hand searches of other relevant literature were performed on the following topics:

Medical nutrition therapy (MNT)
Frequency and duration of MNT
Calorie prescription
Carbohydrate prescription
Carbohydrate and post prandial breakfast glycemia

Each evidence analysis topic has a link to supporting evidence, where the Search Plan and Results can be found. Here, the reader can view when the search plan was performed, inclusion and exclusion criteria, search terms, databases that were searched and the excluded articles.

Number of Source Documents

The number of supporting documents is provided for each recommendation on the Academy of Nutrition and Dietetics Web site .

Methods Used to Assess the Quality and Strength of the Evidence

Expert Consensus

Weighting According to a Rating Scheme (Scheme Given)

Rating Scheme for the Strength of the Evidence

Conclusion Grading Table

Strength of Evidence Elements	Grade I Good/Strong	Grade II Fair	Grade III Limited/Weak	Grade IV Expert Opinion Only	Grade V Grade Not Assignable
Quality Scientific rigor/validity Considers design and execution	Studies of strong design for question Free from design flaws, bias and execution problems	Studies of strong design for question with minor methodological concerns OR Only studies of weaker study design for question	Studies of weak design for answering the question OR Inconclusive findings due to design flaws, bias or execution problems	No studies available Conclusion based on usual practice, expert consensus, clinical experience, opinion, or extrapolation from basic research	No evidence that pertains to question being addressed
Consistency Of findings across studies	Findings generally consistent in direction and size of effect or degree of association, and statistical	Inconsistency among results of studies with strong design OR Consistency	Unexplained inconsistency among results from different studies OR	Conclusion supported solely by statements of informed nutrition or medical commentators	NA

Strength of Evidence Elements	Grade I Good/Strong	Grade II Fair	Grade III Limited/Weak	Grade IV Expert Opinion Only	Grade V Grade Not Assignable
Quantity Number of studies Number of subjects in studies	One to several good quality studies Large number of subjects studied Studies with negative results having sufficiently large sample size for adequate statistical power	Several studies by independent investigators Doubts about adequacy of sample size to avoid Type I and Type II error	Limited number of studies Low number of subjects studied and/or inadequate sample size within studies	Unsubstantiated by published studies	Relevant studies have not been done
Clinical Impact Importance of studies outcomes Magnitude of effect	Studied outcome relates directly to the question Size of effect is clinically meaningful Significant (statistical) difference is large	Some doubt about the statistical or clinical significance of effect	Studies outcome is an intermediate outcome or surrogate for the true outcome of interest OR Size of effect is small or lacks statistical and/or clinical significance	Objective data unavailable	Indicates area for future research
Generalizability To population of interest	Studied population, intervention and outcomes are free from serious doubts about generalizability	Minor doubts about generalizability	Serious doubts about generalizability due to narrow or different study population, intervention or outcomes studied	Generalizability limited to scope of experience	NA

Methods Used to Analyze the Evidence

Systematic Review with Evidence Tables

Description of the Methods Used to Analyze the Evidence

General Methods

Step 1: Formulate the Evidence Analysis Question

Specify a focused question in a defined area of practice. Three key items are used to generate good quality questions: an analytical framework to identify links between factors and outcomes; the PICO (population, intervention, comparison intervention, outcome) format to write questions; and the Nutrition Care Process to serve as a framework.

Step 2: Gather and Classify the Evidence

This step involves developing a search plan to conduct a detailed literature search. The search plan clearly defines the inclusion and exclusion criteria and identifies the key search terms and outcomes necessary to conduct a comprehensive search. The search plan and all literature searches results are documented and assessed for inclusion eligibility.

Step 3: Critically Appraise Each Article (Risk of Bias)

This step involves critically assessing each included article for methodologic quality. Each study is evaluated based on appropriateness of study design and the quality of how the study was conducted by using the Academy's risk of bias tool called the Quality Criteria Checklist (QCC).

Step 4: Summarize the Evidence

This step involves achieving two major tasks. First, key data from the included articles is extracted by using the Academy's Web-based data extraction template. Second, summarizing the evidence extracted from each study into a brief, coherent, and easy-to-read summary. The end result of this phase is called the Evidence Summary.

Step 5: Write and Grade the Conclusion Statement

This step includes developing a concise conclusion statement for the research question and assigning a grade to the conclusion statement. The grade reflects the overall strength and weakness of evidence in forming the conclusion statement. The grading scale used by the Academy is: Grade I (good/strong), II (fair), III (limited/weak), IV (expert opinion only), or V (not assignable) (see the "Rating Scheme for the Strength of the Evidence" field).

Methods Used to Formulate the Recommendations

Expert Consensus

Description of Methods Used to Formulate the Recommendations

Development of Evidence-Based Nutrition Practice Guidelines

The expert workgroup, which includes practitioners and researchers with a depth of experience in the specific field of interest, develops the disease-specific guideline. The guideline development involves the following steps.

- Review the conclusion statements: The workgroup meets to review the materials resulting from the evidence analysis, which may include conclusion statements, evidence summaries, and evidence worksheets.
- Formulate recommendations for the guideline integrating conclusions from evidence analysis: The workgroup uses an expert consensus method to formulate recommendations and complete the various sections on the recommendation page. These include:
  - Recommendation(s): This is a course of action for the practitioner. The recommendation is written using two brief and separate statements. The first statement is "what" the dietitian should do or not do? The second statement describes the "why" of the recommendation. More than one recommendation may be formulated depending on a particular topic and the supporting conclusion statements.
    - Rating: The rating for the recommendation is based on the strength of the supporting evidence. The grade of the supporting conclusion statement(s) will be help determining this rating (see the "Rating Scheme for the Strength of the Recommendations" field).
    - Label of conditional or imperative: Each recommendation will have a label of "conditional" or "imperative." Conditional statements clearly define a specific situation, while imperative

statements are broadly applicable to the target population without restraints on their pertinence.

Risks and harms of implementing the recommendations: Includes any potential risks, anticipated harms or adverse consequences associated with applying the recommendation(s) to the target population.

Conditions of application: Includes any organizational barriers or changes that would need to be made within an organization to apply the recommendation in daily practice. Also includes any conditions which may limit the application of the recommendation(s). For instance, application may be limited to only people in an inpatient setting, or not applicable for pregnant women. Facilitators for the application of the guideline may also be listed here. Conditional recommendations will always have conditions specified. Imperative recommendations may have some general conditions for application.

Potential costs associated with application: Includes any costs that may be associated with the application of this recommendation such as specialized staff, new equipment or treatments.

Recommendation narrative: Provides a brief description of the evidence that supports this recommendation.

Recommendation strength rationale: Provides a brief list of the evidence strength and methodological issues that determined the recommendation strength.

Minority opinions: If the expert workgroup cannot reach consensus on the recommendation, the minority opinions may be listed here.

Supporting evidence: Provides links to the conclusions statements, evidence summaries and worksheets related to the formulation of this recommendation(s).

References not graded in the Academy's evidence analysis process: Recommendations are based on the summarized evidence from the analysis. Sources that are not analyzed during the evidence analysis process may be used to support and formulate the recommendation or to support information under other categories on the recommendation page, if the workgroup deems necessary. References must be credible resources (e.g., consensus reports, other guidelines, position papers, standards of practice, articles from peer-reviewed journals, nationally recognized documents or websites). If recommendations are based solely on these types of references, they will be rated as "consensus." Occasionally recommendations will include references that were not reviewed during the evidence analysis process but are relevant to the recommendation, risks and harms of implementing the recommendation, conditions of application, or potential costs associated with application. These references will be listed on the recommendation page under "References Not Graded in the Academy's Evidence Analysis Process."

Nutrition Care Process: The workgroup assigns a category based on the Academy's Nutrition Care Process to display how each recommendation can be used within the treatment process and how they relate to Nutrition Assessment, Diagnosis, Intervention and Monitoring and Evaluation.

Complete the writing of the guideline: Each disease-specific guideline has a similar format which incorporates the Introduction (includes: Scope of the Guideline, Statement of Intent, Guideline Methods, Implementation, Benefits and Risks/Harms of Implementation), Background Information and any necessary Appendices. The workgroup develops these features.

Criteria used in guideline development: The criteria used in determining the format and process for development of Academy's guidelines are based on the following tools and criteria for evidence-based guidelines:

Guideline Elements Model (GEM), which has been incorporated by the American Society for Testing and Materials (ASTM) as a Standard Specification for clinical practice guidelines

Appraisal for Guidelines Research and Evaluation (AGREE) Instrument

National Guideline Clearinghouse (NGC) www.guideline.gov

Rating Scheme for the Strength of the Recommendations

Conditional versus Imperative Recommendations

Recommendations are categorized in terms of either *imperative* or *conditional* statements.

> *Imperative* statements are broadly applicable to the target population and do not impose restraints on their pertinence. Imperative recommendations may include terms such as "should" or "may" and do not contain conditional text that would limit their applicability to specified circumstances. *Conditional* statements clearly define a specific situation or population. Conditional recommendations are often presented in an if/then format, such that if CONDITION then ACTION(S) because REASONS(S)

Fulfillment of the condition triggers one or more guideline-specified actions.

Criteria for Recommendation Ratings

Statement Rating	Definition	Implication for Practice
Strong	A Strong recommendation means that the workgroup believes that the benefits of the recommended approach clearly exceed the harms (or that the harms clearly exceed the benefits in the case of a strong negative recommendation), and that the quality of the supporting evidence is excellent/good (grade I or II). In some clearly identified circumstances, strong recommendations may be made based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits strongly outweigh the harms.	Practitioners should follow a Strong recommendation unless a clear and compelling rationale for an alternative approach is present.
Fair	A Fair recommendation means that the workgroup believes that the benefits exceed the harms (or that the harms clearly exceed the benefits in the case of a negative recommendation), but the quality of evidence is not as strong (grade II or III). In some clearly identified circumstances, recommendations may be made based on lesser evidence when high-quality evidence is impossible to obtain and the anticipated benefits outweigh the harms.	Practitioners should generally follow a Fair recommendation but remain alert to new information and be sensitive to patient preferences.
Weak	A Weak recommendation means that the quality of evidence that exists is suspect or that well-done studies (grade I, II, or III) show little clear advantage to one approach versus another.	Practitioners should be cautious in deciding whether to follow a recommendation classified as Weak, and should exercise judgment and be alert to emerging publications that report evidence. Patient preference should have a substantial influencing role.
Consensus	A Consensus recommendation means that Expert opinion (grade IV) supports the guideline recommendation even though the available scientific evidence did not present consistent results, or controlled trials were lacking.	Practitioners should be flexible in deciding whether to follow a recommendation classified Consensus, although they may set boundaries on alternatives. Patient preference should have a substantial influencing role.
Insufficient Evidence	An Insufficient Evidence recommendation means that there is both a lack of pertinent evidence (grade V) and/or an unclear balance between benefits and harms.	Practitioners should feel little constraint in deciding whether to follow a recommendation labeled as Insufficient Evidence and should exercise judgment and be alert to emerging publications that report evidence that clarifies the balance of benefit versus harm. Patient preference should have a substantial influencing role.

Adapted by the Academy of Nutrition and Dietetics (AND) from the American Academy of Pediatrics, Classifying Recommendations for Clinical Practice Guideline, Pediatrics. 2004;114;874-7. Revised by the AND Evidence-Based Practice Committee, Feb 2006.

Cost Analysis

A formal cost analysis was not performed and published cost analyses were not reviewed.

Method of Guideline Validation

External Peer Review

Internal Peer Review

Description of Method of Guideline Validation

Each guideline is reviewed internally and externally using the Appraisal of Guidelines for Research and Evaluation (AGREE II) Instrument as the evaluation tool. The external reviewers consist of a multidisciplinary group of individuals (may include dietitians, doctors, psychologists, nurses, etc.). The guideline is adjusted by consensus of the expert panel and approved by Academy's Evidence-Based Practice Committee prior to publication on the Evidence Analysis Library (EAL).

Evidence Supporting the Recommendations

Type of Evidence Supporting the Recommendations

The type of supporting evidence is identified and graded for each recommendation (see the "Major Recommendations" field).

The guideline contains conclusion statements that are supported by evidence summaries and evidence worksheets. These resources summarize the important studies (randomized controlled trials [RCTs], clinical trials, observational studies, cohort and case-control studies) pertaining to the conclusion statement and provide the study details.

Benefits/Harms of Implementing the Guideline Recommendations

Potential Benefits

When implementing these recommendations, consider the following general benefits:

- Improve the patient's ability to achieve optimal nutrition through healthful food choices and physically active lifestyle
- Achieve blood glucose targets
- Achieve maternal weight gain targets
- Achieve fetal growth/development targets
- Prevent adverse maternal and fetal/neonatal outcomes

Potential Harms

Potential risks/harms to consider, when exploring treatment options include:

- Physical activity
  - High-intensity or prolonged exercise in excess of 45 minutes can lead to hypoglycemia.

Pregnant women engaging in physical activity should be advised to ensure adequate caloric intake and to remain well hydrated.

Contact sports (ice hockey, boxing, soccer, basketball), activities with a high risk of falling (skiing surfing, off-road cycling, gymnastics, horseback riding), scuba diving, sky diving, and hot yoga or hot pilates should be avoided.

High-intensity sweeteners

In a 1985 review of saccharin, the American Medical Association suggested pregnant women should consider avoiding saccharin due to limited epidemiological studies in pregnant women and children. To date, more than 30 human studies have found that saccharin is safe for human consumption. Saccharin is approved for use as a non-nutritive high intensity sweetener by the U.S. Food and Drug Administration (FDA).

Micronutrients

Some individuals may not tolerate vitamin and/or mineral supplementation.

In general, pregnant women should seek medical consultation before or while taking a non-prescribed over-the-counter (OTC) micronutrient supplement that exceeds the tolerable upper limits (UL) for a particular vitamin or mineral, or if taking herbal supplements.

Contraindications

Contraindications

- Absolute contraindications to physical activity include, but are not limited to: hemodynamically significant heart disease, restrictive lung disease, incompetent cervices or cerclage, multiple gestation at risk of premature labor, persistent second or third trimester bleeding, placenta previa after 26 weeks of gestation, premature labor during the current pregnancy, ruptured membranes, preeclampsia or pregnancy induced hypertension (HTN) and severe anemia.
- Relative contraindications to physical activity include, but are not limited to: anemia, unevaluated maternal cardiac arrhythmia, chronic bronchitis, poorly controlled type 1 diabetes, extreme morbid obesity, extreme underweight (body mass index [BMI] below 12 kg/m^2), history of extremely sedentary lifestyle, intrauterine growth restriction in current pregnancy, poorly controlled HTN, orthopedic limitations, poorly controlled seizure disorder, poorly controlled hyperthyroidism, heavy smoker. Pregnant women with relative contraindications to physical activity may be able to incorporate physical activity with individualized recommendations provided by their health care provider.
- Contact sports (ice hockey, boxing, soccer, basketball), activities with a high risk of falling (skiing surfing, off-road cycling, gymnastics, horseback riding), scuba diving, sky diving, and hot yoga or hot pilates should be avoided.

Qualifying Statements

Qualifying Statements

This guideline is not intended:

For interventions typically within the scope of practice of a certified exercise physiologist or other professional, for which, adequate training in physical activity interventions and other therapies is necessary.

As a replacement for interventions typically within the scope of practice of an athletic trainer or behavioral or psychological professional, for which adequate training in physical activity interventions or behavioral therapy is necessary.

Preconception nutrition guidance for prevention of gestational diabetes mellitus (GDM)

For postpartum prevention of diabetes
To address factors influencing recurrence of GDM or progression to type 2 diabetes

Statement of Intent

Evidence-based nutrition practice guidelines are developed to help dietetic practitioners, patients and consumers make shared decisions about health care choices in specific clinical circumstances. If properly developed, communicated and implemented, guidelines can improve care.

While they represent a statement of best practice based on the latest available evidence at the time of publishing, they are not intended to overrule professional judgment. Rather, they may be viewed as a relative constraint on individual clinician discretion in a particular clinical circumstance. The independent skill and judgment of the health care provider must always dictate treatment decisions. These nutrition practice guidelines are provided with the express understanding that they do not establish or specify particular standards of care, whether legal, medical or other.

The Role of Patient Preference

This guideline recognizes the role of patient preferences for possible outcomes of care, when the appropriateness of a clinical intervention involves a substantial element of personal choice or values. With regard to types of evidence that are associated with particular outcomes, Shaughnessy and Slawson describe two major classes. Patient-oriented evidence that matters (POEM) deals with outcomes of importance to patients, such as changes in morbidity, mortality or quality of life. Disease-oriented evidence (DOE) deals with surrogate end-points, such as changes in laboratory values or other measures of response. Although the results of DOE sometimes parallel the results of POEM, they do not always correspond.

When possible, the Academy of Nutrition and Dietetics (AND) recommends using POEM-type evidence rather than DOE. When DOE is the only guidance available, the guideline indicates that key clinical recommendations lack the support of outcomes evidence.

Implementation of the Guideline

Description of Implementation Strategy

The publication of this guideline is an integral part of the plans for disseminating the Academy of Nutrition and Dietetics evidence-based recommendations on gestational diabetes mellitus (GDM) to all dietetics practitioners engaged in, teaching about or researching GDM, as quickly as possible. National implementation workshops at various sites around the country and during the Academy Food Nutrition Conference Expo (FNCE) are planned. Additionally, there are recommended dissemination and adoption strategies for local use of the Academy GDM Evidence-Based Nutrition Practice Guideline.

The guideline development team recommended multi-faceted strategies to disseminate the guideline and encourage its implementation. Management support and learning through social influence are likely to be effective in implementing guidelines in dietetic practice. However, additional interventions may be needed to achieve real change in practice routines.

Implementation of the GDM Guideline will be achieved by announcement at professional events, presentations and training. Some strategies include:

National and local events: State dietetic association meetings and media coverage will help launch the guideline
Local feedback adaptation: Presentation by members of the work group at peer review meetings and opportunities for clinical effectiveness units (CEUs) for courses will be provided
Education initiatives: The guideline and supplementary resources will be freely available for use in the education and training of dietetic interns and students in approved Accreditation Council for

Education in Nutrition and Dietetics (ACEND) programs
Champions: Local champions will be identified and expert members of the guideline team will prepare articles for publications. Resources will be provided that include PowerPoint presentations, full guidelines and pre-prepared case studies

Specific distribution strategies include:

Publication in full: The guideline will be available electronically at the Academy Evidence Analysis Library Web site and will be announced to all the dietetic practice groups. The Academy Evidence Analysis Library will also provide downloadable supporting information.

Implementation Tools

Quick Reference Guides/Physician Guides

Slide Presentation

For information about availability, see the *Availability of Companion Documents* and *Patient Resources* fields below.

Institute of Medicine (IOM) National Healthcare Quality Report Categories

IOM Care Need

Getting Better

Living with Illness

Staying Healthy

IOM Domain

Effectiveness

Patient-centeredness

Identifying Information and Availability

Bibliographic Source(s)

Academy of Nutrition and Dietetics. Gestational diabetes mellitus evidence-based nutrition practice guideline. Chicago (IL): Academy of Nutrition and Dietetics; 2016. Various p.

Adaptation

Not applicable: The guideline was not adapted from another source.

Date Released

2016

Guideline Developer(s)

Academy of Nutrition and Dietetics - Professional Association

Source(s) of Funding

Academy of Nutrition and Dietetics

Guideline Committee

Expert Workgroup

Composition of Group That Authored the Guideline

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Financial Disclosures/Conflicts of Interest

In the interest of full disclosure, the Academy has adopted the policy of revealing relationships workgroup members have with companies that sell products or services that are relevant to this topic. Workgroup members are required to disclose potential conflicts of interest by completing the Academy Conflict of Interest Form. It should not be assumed that these financial interests will have an adverse impact on the content, but they are noted here to fully inform readers.

None of the workgroup members listed above disclosed potential conflicts of interest.

Guideline Status

This is the current release of the guideline.

This guideline updates a previous version: American Dietetic Association (ADA). Gestational diabetes mellitus (GDM). Evidence based nutrition practice guideline. Chicago (IL): American Dietetic Association (ADA); 2008. Various p. [234 references]

This guideline meets NGC's 2013 (revised) inclusion criteria.

Guideline Availability

Available to members from the Academy of Nutrition and Dietetics Web site .

Availability of Companion Documents

The following are available:

Gestational diabetes mellitus evidence-based nutrition practice guideline. Executive summary of recommendations. Chicago (IL): Academy of Nutrition and Dietetics; 2016. Available from the Academy of Nutrition and Dietetics (AND) Web site .
Gestational diabetes mellitus evidence-based nutrition practice guideline. PowerPoint presentation. Chicago (IL): Academy of Nutrition and Dietetics; 2016. 59 p. Available for purchase from the eatrightStore Web site .
Evidence analysis manual: research and strategic business development. Steps in the Academy evidence analysis process. Chicago (IL): Academy of Nutrition and Dietetics; 2012 Aug. 112 p. Available from the AND Web site .
Handu D, Moloney L, Wolfram T, Ziegler P, Acosta A, Steiber A. Academy of Nutrition and Dietetics methodology for conducting systematic reviews for the Evidence Analysis Library. J Acad Nutr Dietet. 2016 Feb;116(2):311-8. Available from the AND Web site .

Patient Resources

None available

NGC Status

This NGC summary was completed by ECRI on April 29, 2003. The information was verified by the guideline developer on August 6, 2003. This summary was updated by ECRI Institute on February 9, 2010. The information was verified by the guideline developer on March 9, 2010. This summary was updated by ECRI Institute on August 8, 2017. The guideline developer agreed to not review the content.

This NEATS assessment was completed by ECRI Institute on August 11, 2017. The information was verified by the guideline developer on September 5, 2017.

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When modifying the guidelines for local circumstances, significant departures from these comprehensive guidelines should be fully documented and the reasons for the differences explicitly detailed.

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